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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,396	01/16/2004	Ryoichi Kajiware	503.38097CX1	6074

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EXAMINER

CHAMBLISS, ALONZO

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 05/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/758,396

Applicant(s)

KAJIWARA ET AL.

Examiner

Alonzo Chambliss

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2 and 4-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/20/06 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. In claim 8, the phrase " first metallic member is connected to plural outer wirings extended from a part having a connecting part of the first electrode " is vague and indefinite since not clear from the claim where the " a part " and " connecting part " is referring to.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 4, 5, and 8, insofar as definite are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasem et al. (U.S. 6,249,041) in view of Sharma et al. (U.S. 4,927,505).

With respect to Claims 1, Kasem discloses a semiconductor substrate 12 (i.e. cut from a wafer with a first electrode (i.e. source or gate contact area) provide on a front plane of the semiconductor substrate 12. A second electrode (i.e. drain contact area) on a rear plane of the semiconductor substrate 12. A first metallic member 18a or 20a connected to the first electrode. A second metallic member 22a to the second electrode via a metallic layer 19 containing a first precious metal (i.e. silver) with solder bumps (see col. 3 lines 1-15 and 45-67 and col. 4 lines 1-20; Figs. 1A, 1B, 2B-2D, 3A, 3B, 4A, 4B, 5C, and 5D). Kasem fails to disclose wherein the metallic layer is a composite metal layer comprising a first precious metal layer metallurgically bonded to the

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second electrode and a second precious metal layer metallicity bonded to the second metallic member. The precious metal layer being adhered to the second precious metal layer by compression bonding. However, Sharma discloses a metallic layer is a composite metal layer comprises Au layer 17 (i.e. first precious metal layer) and Au bump 20 (i.e. second precious metal layer), wherein the first precious metal layer 17 metallicity bonded to an electrode 11 and the second precious metal layer 20 metallicity bonded to the metallic member. The first precious metal layer 17 is adhered to the second precious metal layer 20 (see col. 4 lines 26-67; Figs. 1C-1E). The phrase "by compression bonding" makes the claim a "product by process" claim. In a "product by process" claim, the claim is directed to the product per se, no matter how actually made, *In re Brown*, 190 USPQ 15 at 17 (footnote 3) and *In re Thorpe et al.*, 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Thus, Kasem and Sharma have substantially the same environment of a bump attached to a lead and an electrode of a semiconductor device. Therefore, one skilled in the art at the time of invention would readily recognize substituting a first and second precious metal layer bond for the adhesive layer and bump bond of Kasem, since the bonding of the first and second precious metal layers would facilitate in a reliable electrical connection between a semiconductor device and lead while improve the bond strength between the lead and semiconductor device as taught by Sharma.

With respect to Claim 4, Kasem discloses wherein a surface part of the first metallic member for connecting to outer wirings and a surface part of the second metallic member are substantially positioned in a same plane (see Figs. 2B-2D, 3B, and 6B).

With respect to Claim 5, Kasem discloses wherein the first electrode and the first metallic member are connected through plural electrodes (i.e. bumps)(see col. 4 lines 10-20).

With respect to Claim 8, Kasem discloses the first metallic member that is connected to plural outer wirings extended from a part of surface of a board electrically connected to the first electrode (see col. 3 lines 6-11).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claim 2 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Berndlmaier et al. (US 5,053,851).

With respect to Claim 2, Berndlmaier teaches a semiconductor chip 10 with an electrode 12 provided on the chip 10. A metallic member 50 is connected to the electrode 12, wherein the electrode comprises one of an Al film and an Al alloy film. The front plane of the metallic member is provided with a plated precious metal film (i.e.

Au layer). The electrode is metallicity bonded to the precious metal film provided on the metallic member 50 via Au bump (i.e. the combination of 36, 38, 42, and 44 wherein the bump comprising Au layer). The Au bump being adhered to the precious metal film by compression bonding. Thus, based on the pressure when the lead is attached to the bump, the area of the respective Au/Al bonding region would be inherently at least 80% of contacting a area of the Au bumps. The bonding region being made of an Au/Al alloy layer in the thickness direction (see col. 3 lines 7-67 and col. 4 lines 21-67; Figs. 2-4).

The phrase " plated " and " compression bonding " makes the claim a " product by process " claim. In a " product by process " claim, the claim is directed to the product per se, no matter how actually made, *In re Brown*, 190 USPQ 15 at 17 (footnote 3) and *In re Thorpe et al.*, 227 USPQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a " product by process " claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in " product by process " claims or not.

9. Claim 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasem et al. (US 6,249,041) and Sharma et al. (US 4,927,505) as applied to claim 1 above, and further in view of Berndlmaier et al. (US 5,053,851).

With respect to Claim 6, Kasem-Sherma fails to explicitly disclose the metallic layer made of a metal alloy layer having a solid phase temperature of more than 400°C and containing the precious metal as a main component. However, Berndlmaier discloses a metallic layer made of a metal alloy layer having a solid phase temperature

of more than 400° C and containing the precious metal as a main component (see col. 4 lines 5-10). Thus, Kasem-Sherma and Berndlmaier have substantially the same environment of a chip mounted to a lead via a bump. Therefore, one skilled in the art would readily recognize substituting the bump composition for bump composition of Kasem-Sherma, since the bump composition would provide a reliable electrically connection between a chip and lead while facilitating a strong bond between components as taught by Berndlmaier.

10. Claim 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasem et al. (US 6,249,041) and Sharma et al. (US 4,927,505) as applied to claim 1 above, and further in view of Brady et al. (US 5,134,460).

With respect to Claim 7, Kasem-Sharma discloses the claimed invention except for a bump electrode 50 provided between a precious metallic layer positioned on an electrode and a precious metallic layer positioned on the metallic member. However, Brady discloses a bump electrode 50 provided between a precious metallic layer 75 positioned on an electrode 12 and a precious metallic layer 62 positioned on the metallic member 61 (see col. 7 lines 35-67, Tables III and IV; Figs. 1-6). Thus, Kasem-Sherma and Brady have substantially the same environment of a chip mounted to a lead via a bump. Therefore, one skilled in the art would readily recognize substituting a lead coated with a first precious metal layer for the lead of Kasem-Sherma, since the coated lead would provide a reliable electrically connection between a chip and lead while facilitating a strong bond between components as taught by Berndlmaier.

The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

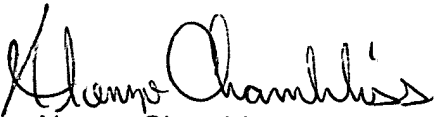
Conclusion

11. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (571) 272-1927.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system Status information for published applications may be obtained from either Private PMR or Public PMR. Status information for unpublished applications is available through Private PMR only. For more information about the PMR system see <http://pair-dkect.uspto.gov>. Should you have questions on access to the Private PMR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or EBC_Support@uspto.gov.

AC/April 30, 2006


Alonzo Chambliss
Primary Patent Examiner
Art Unit 2814